

Replace the paragraph beginning at page 10, line 21, with the following rewritten paragraph:

-- - DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,--

Replace the paragraph beginning at page 10, line 24, with the following rewritten paragraph:

-- - DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' : (SEQ ID NO: 14) mixture of 32 nucleotide sequences,--

Replace the paragraph beginning at page 10, line 26, with the following rewritten paragraph:

-- - DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID NO: 15) mixture of 16 nucleotide sequences,--

Replace the paragraph beginning at page 10, line 28, with the following rewritten paragraph:

-- - DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID NO: 16) mixture of 24 nucleotide sequences,--

Replace the paragraph beginning at page 10, line 30, with the following rewritten paragraph:

-- - DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID NO: 17) mixture of 6 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 2, with the following rewritten paragraph:

-- - BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18) mixture of 16 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 4,
with the following rewritten paragraph:

-- - BN3+ : 5' GGm GAY TAY TCb ACm GGY GC 3' : (SEQ ID
NO: 19) mixture of 96 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 6,
with the following rewritten paragraph:

-- - BN6+ : 5' Twy GAR CGy AAC GAY mTC GA 3' : (SEQ ID
NO: 20) mixture of 64 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 9,
with the following rewritten paragraph:

-- - BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID
NO: 21) mixture of 216 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 11,
with the following rewritten paragraph:

-- - BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID
NO: 22) mixture of 192 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 13,
with the following rewritten paragraph:

-- - BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO:
23) mixture of 72 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 16,
with the following rewritten paragraph:

-- - BC1+ : 5' ACn CCn GAR AAr TTy GAR GC 3' : (SEQ ID
NO: 24) mixture of 256 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 18,
with the following rewritten paragraph:

-- - BC2+ : 5' TGy ATTh GAY TGy CAy AAr GG 3' : (SEQ ID
NO: 25) mixture of 96 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 21,
with the following rewritten paragraph:

-- - BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID
NO: 26) mixture of 96 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 23,
with the following rewritten paragraph:

-- - BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO:
27) mixture of 128 nucleotide sequences,--

Replace the paragraph beginning at page 11, line 31,
with the following rewritten paragraph:

-- - DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ
ID NO: 12) mixture of 54 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 1,
with the following rewritten paragraph:

-- - DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID
NO: 13) mixture of 4 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 4,
with the following rewritten paragraph:

-- - DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' :
(SEQ ID NO: 14) mixture of 32 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 6,
with the following rewritten paragraph:

-- - DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ
ID NO: 15) mixture of 16 nucleotide sequences, --

Replace the paragraph beginning at page 12, line 8,
with the following rewritten paragraph:

-- - DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ
ID NO: 16) mixture of 24 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 10,
with the following rewritten paragraph:

-- - DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID
NO: 17) mixture of 6 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 14,
with the following rewritten paragraph:

-- - BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO:
18) mixture of 16 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 16,
with the following rewritten paragraph:

-- - BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3' : (SEQ ID
NO: 19) mixture of 96 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 18,
with the following rewritten paragraph:

-- - BN6+ : 5' Twy GAr CGy AAC GAY mTC GA 3' : (SEQ ID
NO: 20) mixture of 64 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 21,
with the following rewritten paragraph:

-- - BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID
NO: 21) mixture of 216 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 23,
with the following rewritten paragraph:

-- - BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID
NO: 22) mixture of 192 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 25,
with the following rewritten paragraph:

-- - BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO:
23) mixture of 72 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 29,
with the following rewritten paragraph:

-- - BC1+ : 5' ACn CCn GAr AAr TTy GAr GC 3' : (SEQ ID
NO: 24) mixture of 256 nucleotide sequences,--

Replace the paragraph beginning at page 12, line 31,
with the following rewritten paragraph:

-- - BC2+ : 5' TGy ATy Gay TGy CAy AAr GG 3' : (SEQ ID
NO: 25) mixture of 96 nucleotide sequences,--

Replace the paragraph beginning at page 13, line 2,
with the following rewritten paragraph:

-- - BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID
NO: 26) mixture of 96 nucleotide sequences,--

Replace the paragraph beginning at page 13, line 4, with the following rewritten paragraph:

-- - BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27) mixture of 128 nucleotide sequences,--

Replace the paragraph beginning at page 18, line 23, with the following rewritten paragraph:

-- - Figure 6 shows the complete peptide sequence (SEQ ID NO: 28) of the TMAO reductase of *Shewanella c.*--

Replace the paragraph beginning at page 18, line 25, with the following rewritten paragraph:

-- - Figure 7 shows the alignment of the peptide sequences of the fragment of the TorA protein of *Photobacterium phosphoreum* (TorA/P.p.) (SEQ ID NO: 29), deduced from the DNA fragment amplified in *P. phosphoreum* with the aid of DDN1+/DDN5- molecular primers, with the corresponding protein regions of the TorA proteins of *Shewanella massilia* (TorA/S.m.) (SEQ ID NO: 30), of *E. coli* (TorA/E.c.) (SEQ ID NO: 31), and of *Rhodobacter sphaeroides* (DorA/R.s.) (SEQ ID NO: 32).--

Replace the paragraph beginning at page 19, line 3, with the following rewritten paragraph:

-- - Figure 9 shows the alignment of nucleic sequences (SEQ ID NOS 33-38, respectively in order of appearance) of a highly conserved region of the gene that codes for the TMAO reductase of bacteria of the genus *Shewanella* and of *E. coli*,

used for producing one of the "DDN" molecular primers according to the invention.--

Replace the paragraph beginning at page 20, line 1, with the following rewritten paragraph:

-- - Figure 13 shows the alignment of nucleic sequences (SEQ ID NOS 33, 39-43, respectively in order of appearance) of a highly conserved region of the gene that codes for the TMAO reductase of bacteria of the genus *Shewanella*, *Rhodobacter* and of *E. coli*, used for producing one of the "BN" molecular primers according to the invention.--

IN THE CLAIMS:

Amend claim 4 as follows:

4. (twice amended) Use according to claim 1, characterized in that the nucleotide sequences are used in the form of pairs of primers chosen from any one of the following three groups of primers:

(1) the group of primers "DDN" comprising:

♦ the following compositions of nucleotide sequences

"DDN+":

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID NO: 12) mixture of 54 nucleotide sequences,

- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,

♦ the following compositions of nucleotide sequences

"DDN-":

- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' :
(SEQ ID NO: 14) mixture of 32 nucleotide sequences,

- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID
NO: 15) mixture of 16 nucleotide sequences,

- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID
NO: 16) mixture of 24 nucleotide sequences,

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID
NO: 17) mixture of 6 nucleotide sequences,

(2) the group of primers "BN" comprising:

♦ the following compositions of nucleotide sequences

"BN+":

- BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18)
mixture of 16 nucleotide sequences,

- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3' : (SEQ ID NO:
19) mixture of 96 nucleotide sequences,

- BN6+ : 5' Twy GAR CGy AAC GAY mTC GA 3' : (SEQ ID NO:
20) mixture of 64 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BN-

":

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO:
21) mixture of 216 nucleotide sequences,

- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO:
22) mixture of 192 nucleotide sequences,

- BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO: 23)
mixture of 72 nucleotide sequences,

(3) the group of primers "BC" comprising:

♦ the following compositions of nucleotide sequences
"BC+":

- BC1+ : 5' ACn CCn GAR AAr TTy GAR GC 3' : (SEQ ID NO:
24) mixture of 256 nucleotide sequences,

- BC2+ : 5' TGy ATy GAY TGy CAy AAr GG 3' : (SEQ ID NO:
25) mixture of 96 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BC-":

- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID NO:
26) mixture of 96 nucleotide sequences,

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27)
mixture of 128 nucleotide sequences,

in which $n = (A, C, G, T)$, $y = (C, T)$, $r = (A, G)$, $h = (A, C, T)$, $d = (G, A, T)$, $m = (A, C)$, $w = (A, T)$, $b = (G, T, C)$, $s = (G, C)$, $v = (G, A, C)$, and $k = (G, T)$,

the pairs of primers being chosen in such a way that one of the primers of a pair corresponds to one of the aforementioned compositions of nucleotide sequences DDN+, BN+ or BC+, whereas the other primer corresponds respectively to one of the aforementioned compositions of nucleotide sequences DDN-, BN- or BC-, the said pairs of primers being chosen in particular from any one of the following four pairs:

(a) the pair DDN1+/DDN5-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, of a size of about 820 base pairs (bp), and especially to the amplification of an 821 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 821 bp fragment bounded by the nucleotides located in positions 620 to 1450 of the *torA* gene of *S. massilia* shown in Figure 4,

(b) the pair BN6+/BN2-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 710 bp, and especially to the amplification of a 727 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 727 bp fragment bounded by the nucleotides located in positions 1657 to 2403 of the *torA* gene of *S. massilia* shown in Figure 4,

(c) the pair BN6+/BN4-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 360 bp, and especially to the amplification of a 355 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 355 bp fragment bounded by the nucleotides located in positions 1657 to 2023 of the *torA* gene of *S. massilia* shown in Figure 4,

(d) the pair BC1+/BC2-, leading to amplification of fragments of the gene coding for the TorC protein in bacteria, with a size of about 170 bp, and especially to the amplification of a 197 bp fragment of the gene coding for the TorC protein in

bacteria of the genus *Shewanella*, such as the 197 bp fragment coding for the polypeptide fragment bounded by the amino acids located in positions 114 to 179 of the TorC protein of *S. massilia* shown in Figure 14.

Amend claim 7 as follows:

7. (amended) A nucleotide sequence corresponding to one of the following sequences (SEQ ID NOS 12-27, respectively in order of appearance):

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3',
- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3',
- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3',
- DDN3- : 5' GAC TCA CAY Awy TGy GAG TG 3',
- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3',
- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3',
- BN1+ : 5' C bGA yAT CsT rCT GCC 3',
- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3',
- BN6+ : 5' Twy GAR CGy AAC GAY mTC GA 3',
- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3',
- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3',
- BN5- : 5' GbC ACr TCd GTy TGy GG 3',
- BC1+ : 5' ACn CCn GAR AAr TTy GAR GC 3',
- BC2+ : 5' TGy ATy GAY TGy CAY AAr GG 3',
- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3',
- BC3- : 5' TTn GCr TCr AAr TGn GC 3',

in which $n = (A,C,G,T)$, $y = (C,T)$, $r = (A,G)$, $h = (A,C,T)$, $d = (G,A,T)$, $m = (A,C)$, $w = (A,T)$, $b = (G,T,C)$, $s = (G,C)$, $v = (G,A,C)$, and $k = (G,T)$.

Amend claim 8 as follows:

8. (amended) A composition of nucleotide sequences mixed together, corresponding to one of the following compositions:

♦ the following compositions of nucleotide sequences

"DDN+":

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID NO: 12) mixture of 54 nucleotide sequences,

- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,

♦ the following compositions of nucleotide sequences

"DDN-":

- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' : (SEQ ID NO: 14) mixture of 32 nucleotide sequences,

- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID NO: 15) mixture of 16 nucleotide sequences,

- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID NO: 16) mixture of 24 nucleotide sequences,

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID NO: 17) mixture of 6 nucleotide sequences,

♦ the following compositions of nucleotide sequences

"BN+":

- BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18)
mixture of 16 nucleotide sequences,

- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3' : (SEQ ID NO:
19) mixture of 96 nucleotide sequences,

- BN6+ : 5' Twy GAR CGy AAC GAY mTC GA 3' : (SEQ ID NO:
20) mixture of 64 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BN-
":

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO:
21) mixture of 216 nucleotide sequences,

- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO:
22) mixture of 192 nucleotide sequences,

- BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO: 23)
mixture of 72 nucleotide sequences,

♦ the following compositions of nucleotide sequences
"BC+":

- BC1+ : 5' ACn CCn GAR AAr TTy GAR GC 3' : (SEQ ID NO:
24) mixture of 256 nucleotide sequences,

- BC2+ : 5' TGy ATb GAY TGy CAy AAr GG 3' : (SEQ ID NO:
25) mixture of 96 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BC-
":

- BC2- : 5' CCy TTr TGr CAR TCd ATr CA 3' : (SEQ ID NO:
26) mixture of 96 nucleotide sequences,

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27)
mixture of 128 nucleotide sequences,

in which n = (A,C,G,T), y = (C,T), r = (A,G), h =
(A,C,T), d = (G,A,T), m = (A,C), w = (A,T), b = (G,T,C), s =
(G,C), v = (G,A,C), and k = (G,T).

Amend claim 9 as follows:

9. (amended) A pair of primers, characterized in that it
is chosen from one of the following groups of primers:

(1) the group of primers "DDN" comprising:

♦ the following compositions of nucleotide sequences
"DDN+":

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID
NO: 12) mixture of 54 nucleotide sequences,

- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID
NO: 13) mixture of 4 nucleotide sequences,

♦ the following compositions of nucleotide sequences
"DDN-":

- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' :
(SEQ ID NO: 14) mixture of 32 nucleotide sequences,

- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID
NO: 15) mixture of 16 nucleotide sequences,

- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID
NO: 16) mixture of 24 nucleotide sequences,

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID NO: 17) mixture of 6 nucleotide sequences,

(2) the group of primers "BN" comprising:

♦ the following compositions of nucleotide sequences

"BN+":

- BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18) mixture of 16 nucleotide sequences,

- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3' : (SEQ ID NO: 19) mixture of 96 nucleotide sequences,

- BN6+ : 5' Twy GAr CGy AAC GAY mTC GA 3' : (SEQ ID NO: 20) mixture of 64 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BN-":

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO: 21) mixture of 216 nucleotide sequences,

- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO: 22) mixture of 192 nucleotide sequences,

- BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO: 23) mixture of 72 nucleotide sequences,

(3) the group of primers "BC" comprising:

♦ the following compositions of nucleotide sequences

"BC+":

- BC1+ : 5' ACn CCn GAr AAr TTy GAr GC 3' : (SEQ ID NO: 24) mixture of 256 nucleotide sequences,

- BC2+ : 5' TGy ATh GAY TGy CAy AAr GG 3' : (SEQ ID NO: 25) mixture of 96 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BC-":

- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID NO: 26) mixture of 96 nucleotide sequences,

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27) mixture of 128 nucleotide sequences,

in which n = (A,C,G,T), y = (C,T), r = (A,G), h = (A,C,T), d = (G,A,T), m = (A,C), w = (A,T), b = (G,T,C), s = (G,C), v = (G,A,C), and k = (G,T),

the pairs of primers being chosen in such a way that one of the primers of a pair corresponds to one of the aforementioned compositions of nucleotide sequences DDN+, BN+ or BC+, whereas the other primer corresponds respectively to one of the aforementioned compositions of nucleotide sequences DDN-, BN- or BC-, the said pairs of primers being chosen in particular from any one of the following four pairs:

(a) the pair DDN1+/DDN5-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, of a size of about 820 base pairs (bp), and especially to the amplification of an 821 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 821 bp fragment bounded by the nucleotides located in positions 620 to 1450 of the *torA* gene of *S. massilia* shown in Figure 4,

(b) the pair BN6+/BN2-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 710 bp, and especially to the amplification of a 727 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 727 bp fragment bounded by the nucleotides located in positions 1657 to 2403 of the *torA* gene of *S. massilia* shown in Figure 4,

(c) the pair BN6+/BN4-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 360 bp, and especially to the amplification of a 355 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 355 bp fragment bounded by the nucleotides located in positions 1657 to 2023 of the *torA* gene of *S. massilia* shown in Figure 4,

(d) the pair BC1+/BC2-, leading to amplification of fragments of the gene coding for the TorC protein in bacteria, with a size of about 170 bp, and especially to the amplification of a 197 bp fragment of the gene coding for the TorC protein in bacteria of the genus *Shewanella*, such as the 197 bp fragment coding for the polypeptide fragment bounded by the amino acids located in positions 114 to 179 of the TorC protein of *S. massilia* shown in Figure 14.

REMARKS

Responsive to the requirement for submission of a new Sequence Listing, imposed in the Notification of Defective Response, the same is provided herewith, attached to the present amendment, in paper and disk formats. Applicants hereby state that the attached paper and computer readable copies have the same content, and introduce no new matter into the present application.

In this regard, the specification and claims have been amended so that they are commensurate with the submission of the present Sequence Listing.

In view of the above, it is respectfully submitted that the above-identified application complies with the requirement for patent applications containing nucleotide sequences and/or amino acid sequence disclosures.

Favorable consideration of this application is respectfully requested.

GIORDANO et al. S.N. 10/088,117

Attached hereto is a marked-up version of the changes made to the specification and claims. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

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September 30, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at page 9, line 30, has been amended as follows:

The invention also relates to any nucleotide sequence corresponding to one of the following sequences (SEQ ID NOS 12-27, respectively in order of appearance:

Paragraph beginning at page 10, line 19, has been amended as follows:

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID NO: 12) mixture of 54 nucleotide sequences,

Paragraph beginning at page 10, line 21, has been amended as follows:

- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,

Paragraph beginning at page 10, line 24, has been amended as follows:

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- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID NO: 15) mixture of 16 nucleotide sequences,

Paragraph beginning at page 10, line 28, has been amended as follows:

- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID NO: 16) mixture of 24 nucleotide sequences,

Paragraph beginning at page 10, line 30, has been amended as follows:

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID NO: 17) mixture of 6 nucleotide sequences,

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- BN3+ : 5' GGm GAY TAY TCb ACm GGY GC 3' : (SEQ ID NO: 19) mixture of 96 nucleotide sequences,

Paragraph beginning at page 11, line 6, has been amended as follows:

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Paragraph beginning at page 11, line 9, has been amended as follows:

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO: 21) mixture of 216 nucleotide sequences,

Paragraph beginning at page 11, line 11, has been amended as follows:

- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO:

22) mixture of 192 nucleotide sequences,

Paragraph beginning at page 11, line 13, has been amended as follows:

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mixture of 72 nucleotide sequences,

Paragraph beginning at page 11, line 16, has been amended as follows:

- BC1+ : 5' ACn CCn GAr AAr TTy GAr GC 3' : (SEQ ID NO:

24) mixture of 256 nucleotide sequences,

Paragraph beginning at page 11, line 18, has been amended as follows:

- BC2+ : 5' TGy ATy GAr TGy CAr AAr GG 3' : (SEQ ID NO:

25) mixture of 96 nucleotide sequences,

Paragraph beginning at page 11, line 21, has been amended as follows:

- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID NO:

26) mixture of 96 nucleotide sequences,

Paragraph beginning at page 11, line 23, has been amended as follows:

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27)

mixture of 128 nucleotide sequences,

Paragraph beginning at page 11, line 31, has been amended as follows:

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID NO: 12) mixture of 54 nucleotide sequences,

Paragraph beginning at page 12, line 1, has been amended as follows:

- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,

Paragraph beginning at page 12, line 4, has been amended as follows:

- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' : (SEQ ID NO: 14) mixture of 32 nucleotide sequences,

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Paragraph beginning at page 12, line 8, has been amended as follows:

- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID NO: 16) mixture of 24 nucleotide sequences,

Paragraph beginning at page 12, line 10, has been amended as follows:

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID NO: 17) mixture of 6 nucleotide sequences,

Paragraph beginning at page 12, line 14, has been amended as follows:

- BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18)

mixture of 16 nucleotide sequences,

Paragraph beginning at page 12, line 16, has been amended as follows:

- BN3+ : 5' GGm GAY TAY TCb ACm GGY GC 3' : (SEQ ID NO:

19) mixture of 96 nucleotide sequences,

Paragraph beginning at page 12, line 18, has been amended as follows:

- BN6+ : 5' Twy GAr CGy AAC GAY mTC GA 3' : (SEQ ID NO:

20) mixture of 64 nucleotide sequences,

Paragraph beginning at page 12, line 21, has been amended as follows:

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO:

21) mixture of 216 nucleotide sequences,

Paragraph beginning at page 12, line 23, has been amended as follows:

- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO:

22) mixture of 192 nucleotide sequences,

Paragraph beginning at page 12, line 25, has been amended as follows:

- BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO: 23)

mixture of 72 nucleotide sequences,

Paragraph beginning at page 12, line 29, has been amended as follows:

- BC1+ : 5' ACn CCn GAr AAr TTy GAr GC 3' : (SEQ ID NO:

24) mixture of 256 nucleotide sequences,

Paragraph beginning at page 12, line 31, has been amended as follows:

- BC2+ : 5' TGy ATn GAY TGy CAy AAr GG 3' : (SEQ ID NO:

25) mixture of 96 nucleotide sequences,

Paragraph beginning at page 13, line 2, has been amended as follows:

- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID NO:

26) mixture of 96 nucleotide sequences,

Paragraph beginning at page 13, line 4, has been amended as follows:

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27)

mixture of 128 nucleotide sequences,

Paragraph beginning at page 18, line 23, has been amended as follows:

- Figure 6 shows the complete peptide sequence (SEQ ID NO: 28) of the TMAO reductase of *Shewanella c.*

Paragraph beginning at page 18, line 25, has been amended as follows:

- Figure 7 shows the alignment of the peptide sequences of the fragment of the TorA protein of *Photobacterium phosphoreum* (TorA/P.p.) (SEQ ID NO: 29), deduced from the DNA fragment amplified in *P. phosphoreum* with the aid of DDN1+/DDN5- molecular primers, with the corresponding protein regions of the TorA

proteins of *Shewanella massilia* (TorA/S.m.) (SEQ ID NO: 30), of *E. coli* (TorA/E.c.) (SEQ ID NO: 31), and of *Rhodobacter sphaeroides* (DorA/R.s.) (SEQ ID NO: 32).

Paragraph beginning at page 19, line 3, has been amended as follows:

- Figure 9 shows the alignment of nucleic sequences (SEQ ID NOS 33-38, respectively in order of appearance) of a highly conserved region of the gene that codes for the TMAO reductase of bacteria of the genus *Shewanella* and of *E. coli*, used for producing one of the "DDN" molecular primers according to the invention.

Paragraph beginning at page 20, line 1, has been amended as follows:

- Figure 13 shows the alignment of nucleic sequences (SEQ ID NOS 33, 39-43, respectively in order of appearance) of a highly conserved region of the gene that codes for the TMAO reductase of bacteria of the genus *Shewanella*, *Rhodobacter* and of *E. coli*, used for producing one of the "BN" molecular primers according to the invention.

IN THE CLAIMS:

Claim 4 has been amended as follows:

4. (twice amended) Use according to claim 1, characterized in that the nucleotide sequences are used in the

form of pairs of primers chosen from any one of the following three groups of primers:

(1) the group of primers "DDN" comprising:

♦ the following compositions of nucleotide sequences

"DDN+":

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID NO: 12) mixture of 54 nucleotide sequences,

- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,

♦ the following compositions of nucleotide sequences

"DDN-":

- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' : (SEQ ID NO: 14) mixture of 32 nucleotide sequences,

- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID NO: 15) mixture of 16 nucleotide sequences,

- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID NO: 16) mixture of 24 nucleotide sequences,

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID NO: 17) mixture of 6 nucleotide sequences,

(2) the group of primers "BN" comprising:

♦ the following compositions of nucleotide sequences

"BN+":

- BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18)
mixture of 16 nucleotide sequences,

- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3' : (SEQ ID NO: 19) mixture of 96 nucleotide sequences,

- BN6+ : 5' Twy GAr CGy AAC GAY mTC GA 3' : (SEQ ID NO: 20) mixture of 64 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BN-":

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO: 21) mixture of 216 nucleotide sequences,

- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO: 22) mixture of 192 nucleotide sequences,

- BN5- : 5' GbC ACr TCd GTy TGY GG 3' : (SEQ ID NO: 23) mixture of 72 nucleotide sequences,

(3) the group of primers "BC" comprising:

♦ the following compositions of nucleotide sequences "BC+":

- BC1+ : 5' ACn CCn GAr AAr TTy GAr GC 3' : (SEQ ID NO: 24) mixture of 256 nucleotide sequences,

- BC2+ : 5' TGY ATTh GAY TGY CAY AAr GG 3' : (SEQ ID NO: 25) mixture of 96 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BC-":

- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID NO: 26) mixture of 96 nucleotide sequences,

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27) mixture of 128 nucleotide sequences,

in which $n = (A,C,G,T)$, $y = (C,T)$, $r = (A,G)$, $h = (A,C,T)$, $d = (G,A,T)$, $m = (A,C)$, $w = (A,T)$, $b = (G,T,C)$, $s = (G,C)$, $v = (G,A,C)$, and $k = (G,T)$,

the pairs of primers being chosen in such a way that one of the primers of a pair corresponds to one of the aforementioned compositions of nucleotide sequences DDN+, BN+ or BC+, whereas the other primer corresponds respectively to one of the aforementioned compositions of nucleotide sequences DDN-, BN- or BC-, the said pairs of primers being chosen in particular from any one of the following four pairs:

(a) the pair DDN1+/DDN5-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, of a size of about 820 base pairs (bp), and especially to the amplification of an 821 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 821 bp fragment bounded by the nucleotides located in positions 620 to 1450 of the *torA* gene of *S. massilia* shown in Figure 4,

(b) the pair BN6+/BN2-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 710 bp, and especially to the amplification of a 727 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 727 bp fragment bounded by the nucleotides located in positions 1657 to 2403 of the *torA* gene of *S. massilia* shown in Figure 4,

(c) the pair BN6+/BN4-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 360 bp, and especially to the amplification of a 355 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 355 bp fragment bounded by the nucleotides located in positions 1657 to 2023 of the *torA* gene of *S. massilia* shown in Figure 4,

(d) the pair BC1+/BC2-, leading to amplification of fragments of the gene coding for the TorC protein in bacteria, with a size of about 170 bp, and especially to the amplification of a 197 bp fragment of the gene coding for the TorC protein in bacteria of the genus *Shewanella*, such as the 197 bp fragment coding for the polypeptide fragment bounded by the amino acids located in positions 114 to 179 of the TorC protein of *S. massilia* shown in Figure 14.

Claim 7 has been amended as follows:

7. (amended) A nucleotide sequence corresponding to one of the following sequences (SEQ ID NOS 12-27, respectively in order of appearance):

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3',
- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3',
- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3',
- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3',
- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3',

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3',
- BN1+ : 5' C bGA yAT CsT rCT GCC 3',
- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3',
- BN6+ : 5' Twy GAR CGy AAC GAY mTC GA 3',
- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3',
- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3',
- BN5- : 5' GbC ACr TCd GTy TGy GG 3',
- BC1+ : 5' ACn CCn GAR AAr TTy GAR GC 3',
- BC2+ : 5' TGy ATTh GAY TGy CAY AAr GG 3',
- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3',
- BC3- : 5' TTn GCr TCr AAr TGn GC 3',

in which $n = (A, C, G, T)$, $y = (C, T)$, $r = (A, G)$, $h = (A, C, T)$, $d = (G, A, T)$, $m = (A, C)$, $w = (A, T)$, $b = (G, T, C)$, $s = (G, C)$, $v = (G, A, C)$, and $k = (G, T)$.

Claim 8 has been amended as follows:

8. (amended) A composition of nucleotide sequences mixed together, corresponding to one of the following compositions:

- ◆ the following compositions of nucleotide sequences

"DDN+":

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID NO: 12) mixture of 54 nucleotide sequences,
- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,

♦ the following compositions of nucleotide sequences

"DDN-":

- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' :
(SEQ ID NO: 14) mixture of 32 nucleotide sequences,
- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID
NO: 15) mixture of 16 nucleotide sequences,
- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID
NO: 16) mixture of 24 nucleotide sequences,
- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID
NO: 17) mixture of 6 nucleotide sequences,

♦ the following compositions of nucleotide sequences

"BN+":

- BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18)
mixture of 16 nucleotide sequences,
- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3' : (SEQ ID NO:
19) mixture of 96 nucleotide sequences,
- BN6+ : 5' Twy GAr CGy AAC GAY mTC GA 3' : (SEQ ID NO:
20) mixture of 64 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BN-

":

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO:
21) mixture of 216 nucleotide sequences,
- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO:
22) mixture of 192 nucleotide sequences,

- BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO: 23)

mixture of 72 nucleotide sequences,

♦ the following compositions of nucleotide sequences

"BC+":

- BC1+ : 5' ACn CCn GAr AAr TTy GAr GC 3' : (SEQ ID NO:

24) mixture of 256 nucleotide sequences,

- BC2+ : 5' TGy ATh GAY TGy CAy AAr GG 3' : (SEQ ID NO:

25) mixture of 96 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BC-

":

- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID NO:

26) mixture of 96 nucleotide sequences,

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27)

mixture of 128 nucleotide sequences,

in which n = (A,C,G,T), y = (C,T), r = (A,G), h = (A,C,T), d = (G,A,T), m = (A,C), w = (A,T), b = (G,T,C), s = (G,C), v = (G,A,C), and k = (G,T).

Claim 9 has been amended as follows:

9. (amended) A pair of primers, characterized in that it is chosen from one of the following groups of primers:

(1) the group of primers "DDN" comprising:

♦ the following compositions of nucleotide sequences

"DDN+":

- DDN1+ : 5' CGG vGA yTA CTC bAC hGG TGC 3' : (SEQ ID NO: 12) mixture of 54 nucleotide sequences,

- DDN5+ : 5' ATy GAT GCG ATy CTC GAA CC 3' : (SEQ ID NO: 13) mixture of 4 nucleotide sequences,

♦ the following compositions of nucleotide sequences "DDN-":

- DDN2- : 5' CGT Amw sGT CGA kAT CGT TrC GCT C 3' : (SEQ ID NO: 14) mixture of 32 nucleotide sequences,

- DDN3- : 5' GAC TCA CAy Awy TGy GAG TG 3' : (SEQ ID NO: 15) mixture of 16 nucleotide sequences,

- DDN4- : 5' TGr CCd CGr kCG TTA AAG AC 3' : (SEQ ID NO: 16) mixture of 24 nucleotide sequences,

- DDN5- : 5' CCv GGT TCG AGr ATC GCA TC 3' : (SEQ ID NO: 17) mixture of 6 nucleotide sequences,

(2) the group of primers "BN" comprising:

♦ the following compositions of nucleotide sequences "BN+":

- BN1+ : 5' C bGA yAT CsT rCT GCC 3' : (SEQ ID NO: 18) mixture of 16 nucleotide sequences,

- BN3+ : 5' GGm GAY TAY TCb ACm GGy GC 3' : (SEQ ID NO: 19) mixture of 96 nucleotide sequences,

- BN6+ : 5' Twy GAr CGy AAC GAY mTC GA 3' : (SEQ ID NO: 20) mixture of 64 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BN-":

- BN2- : 5' GG vyC rTA CCA bsC vCC TTC 3' : (SEQ ID NO: 21) mixture of 216 nucleotide sequences,

- BN4- : 5' ATC Arr CCn swv GGC GTG CC 3' : (SEQ ID NO: 22) mixture of 192 nucleotide sequences,

- BN5- : 5' GbC ACr TCd GTy TGy GG 3' : (SEQ ID NO: 23) mixture of 72 nucleotide sequences,

(3) the group of primers "BC" comprising:

♦ the following compositions of nucleotide sequences "BC+":

- BC1+ : 5' ACn CCn GAR AAr TTy GAR GC 3' : (SEQ ID NO: 24) mixture of 256 nucleotide sequences,

- BC2+ : 5' TGy ATy GAY TGy CAY AAr GG 3' : (SEQ ID NO: 25) mixture of 96 nucleotide sequences,

♦ the following compositions of nucleotide sequences "BC-":

- BC2- : 5' CCy TTr TGr CAr TCd ATr CA 3' : (SEQ ID NO: 26) mixture of 96 nucleotide sequences,

- BC3- : 5' TTn GCr TCr AAr TGn GC 3' : (SEQ ID NO: 27) mixture of 128 nucleotide sequences,

in which $n = (A, C, G, T)$, $y = (C, T)$, $r = (A, G)$, $h = (A, C, T)$, $d = (G, A, T)$, $m = (A, C)$, $w = (A, T)$, $b = (G, T, C)$, $s = (G, C)$, $v = (G, A, C)$, and $k = (G, T)$,

the pairs of primers being chosen in such a way that one of the primers of a pair corresponds to one of the aforementioned compositions of nucleotide sequences DDN+, BN+ or BC+, whereas

the other primer corresponds respectively to one of the aforementioned compositions of nucleotide sequences DDN-, BN- or BC-, the said pairs of primers being chosen in particular from any one of the following four pairs:

(a) the pair DDN1+/DDN5-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, of a size of about 820 base pairs (bp), and especially to the amplification of an 821 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 821 bp fragment bounded by the nucleotides located in positions 620 to 1450 of the *torA* gene of *S. massilia* shown in Figure 4,

(b) the pair BN6+/BN2-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 710 bp, and especially to the amplification of a 727 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 727 bp fragment bounded by the nucleotides located in positions 1657 to 2403 of the *torA* gene of *S. massilia* shown in Figure 4,

(c) the pair BN6+/BN4-, leading to amplification of fragments of the gene coding for the TorA protein in bacteria, with a size of about 360 bp, and especially to the amplification of a 355 bp fragment of the gene coding for the TorA protein in bacteria of the genus *Shewanella*, such as the 355 bp fragment bounded by the nucleotides located in positions 1657 to 2023 of the *torA* gene of *S. massilia* shown in Figure 4,

(d) the pair BC1+/BC2-, leading to amplification of fragments of the gene coding for the TorC protein in bacteria, with a size of about 170 bp, and especially to the amplification of a 197 bp fragment of the gene coding for the TorC protein in bacteria of the genus *Shewanella*, such as the 197 bp fragment coding for the polypeptide fragment bounded by the amino acids located in positions 114 to 179 of the TorC protein of *S. massilia* shown in Figure 14.